LEVEL AND METHOD OF FEEDING DEHYDRATED ALFALFA PELLETS AS A PROTEIN SUPPLEMENT FOR BEEF COWS GRAZING WINTER FLINT HILLS RANGE[1]

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Summary

Four winter protein supplementation schemes were studied using 116 beef cows grazing Flint Hills range. The treatments were: 1) 4.0 lb soybean meal/sorghum grain (27.3% crude protein (CP)) per head daily (SS), 2) 4.0 lb dehydrated alfalfa pellets (DEHY; 20.0% CP) per head daily (LO-DEHY), 3) 5.5 lb DEHY per head daily (HI-DEHY), and 4) DEHY fed at levels calculated to provide 4.0 lb per head daily with less fed in early winter and more fed in late winter (STAGGER-DEHY). The HI-DEHY and SS treatments resulted in higher ($P<.05$) weight gains and smaller ($P<.05$) losses in body condition before calving than the other two treatments. The HI-DEHY group had less cumulative weight loss ($P<.05$) at calving than the SS group. Cow performance was similar ($P>.10$) for the LO-DEHY and STAGGER-DEHY groups. Cow reproductive performance and calf birth weights and average daily gains were unaffected ($P>.10$) by the treatments. All of the supplementation schemes evaluated in this experiment appeared relatively satisfactory, given the initial condition of the cows. However, the higher levels of nutrient supplementation (HI-DEHY and SS; 1 lb CP/d) would probably sustain reproductive performance at a higher level over an extended period of time. Additionally, when DEHY was fed at the low level, altering the schedule of feeding over the winter did not appear to affect cow performance.

(Key Words: Cows, Protein Supplements, Dehydrated Alfalfa Pellets, Winter Range.)

Introduction

Kansas State research has shown that dehydrated alfalfa pellets, when compared with a grain/soybean meal supplement containing a moderate concentration of crude protein (CP; 26%), may increase pre-calving weight gain and decrease weight loss at calving in beef cows grazing native winter range. However, the CP concentration of dehydrated alfalfa is lower than that of typical grain/soybean meal-based supplements, requiring higher levels of dehydrated alfalfa to achieve similar daily CP intakes. One objective of this experiment, therefore, was to determine if animal performance could be maintained at similar levels by supplementing with the same amount of dehydrated alfalfa pellets (20% CP) and soybean meal/sorghum grain (27% CP) or whether increasing the level of dehydrated alfalfa to provide similar amounts of crude protein was necessary. Additionally, the requirements of beef cows for protein and energy are known to increase as the animal nears parturition. Feeding low levels of supplements early in

[1]Appreciation is extended to W. R. Adolph, G. A. Ritter, W. D. Root, and J. R. Bradley for their helpful assistance in conducting this experiment.

the winter and increasing the amount fed as cows near parturition could increase the efficiency of the utilization of the supplemental nutrients. Therefore, the second objective of this experiment was to determine if altering the feeding schedule of the dehydrated alfalfa pellets to more closely match the requirements of the cows would impact the performance of beef cows grazing winter Flint Hills range.

Experimental Procedures

Four protein supplementation schemes were studied using 116 pregnant, Hereford × Angus cows (avg initial wt = 1110 lb; avg initial body condition = 6.1). The treatments were: 1) 4 lb soybean meal/sorghum grain supplement per head daily (27.3% crude protein), 2) 5.5 lb DEHY (20.0% crude protein) per head daily, 3) 4 lb DEHY per head daily, and 4) DEHY fed at a level calculated to provide an average of 4.0 lb/head daily, with amounts fed staggered over the grazing period. For the STAGGER-DEHY treatment, the following feeding schedule was followed: 2 lb/head daily from November 29 to December 30, 3 lb/head daily until January 29, and 5.5 lb/head daily until calving. The average calving date was several days earlier than expected from estimated fetal ages (from August 30 palpation). Therefore, the average supplement consumption for STAGGER-DEHY was 3.8 lb/d. The SS and HI-DEHY treatments each supplied 1 lb of CP/head/d, whereas the LO-DEHY and the STAGGER-DEHY treatments each provided an average of .7 lb CP/head/d. Supplementation began on November 29 and continued until calving (avg calving date = March 11), after which cows were supplemented with 10 lb alfalfa hay/d until sufficient new grass growth was available (approximately the end of April). The three experimental pastures were dominated by big bluestem (*Andropogon gerardii*), indiangrass (*Sorghastrum nutans*), and little bluestem (*Andropogon scoparius*). Each pasture contained animals from all four treatments. These groups were rotated through the pastures every 28 d. The animals in each pasture were gathered daily and sorted into treatment groups prior to being bunk-fed the appropriate supplements.

The cows were weighed and scored for body condition (scale: 1 = extremely thin, 9 = extremely fat) on d 0, 85, 102 (within 48 hr postpartum), 167, and 259 (d 0 = November 29), following an overnight stand without access to food or water. Cows were pasture mated as a single herd to a group of four Angus bulls. The breeding season began on May 15 and continued for 60 d thereafter. Calves were weighed within 48 hr of birth and on d 167 and 259 of the experiment. Pregnancy and approximate fetal ages were determined by rectal palpation (August 30), and conception dates were estimated from the fetal ages.

Results and Discussion

In the prepartum period, cows consuming supplements that provided 1 lb of CP per head daily (HI-DEHY and SS) gained more weight ($P<.05$; Table 28.1) and lost less body condition ($P<.05$; Table 28.1) than cows fed the supplements providing .7 lb CP per head daily (LO-DEHY and STAGGER-DEHY). In the 100 d prepartum, the groups receiving 1 lb of supplemental CP gained an average of 40 lb and lost an average of .25 points in condition, while the other two groups merely maintained their body weights and lost an average of .65 units in condition. Immediately postpartum, the cows on the HI-DEHY supplement had smaller weight losses ($P<.05$) than any of the other groups. However, by the beginning of the breeding

season (d 167), the HI-DEHY and SS supplemented cows had similar (P>.10) cumulative weight losses, which were lower (P<.05) than those of the LOW-DEHY and STAGGER-DEHY groups. Staggering the feeding of DEHY across the winter did not impact cow performance. Cow weight and condition changes were similar (P>.10) for the LO-DEHY and STAGGER-DEHY treatments at all times.

In spite of the differences noted in body weight and condition score, the treatments did not influence (P>.10) reproductive performance of the cows (Table 28.2). Total pregnancy rate averaged 98.3%, and the average calving interval was 365 d. Although numerically the HI-DEHY and SS groups had more cows bred in the first third of the breeding season, these differences were not statistically significant. Calf birth weights and ADGs were similar (P>.10) among treatments.

Table 28.1. Effect of Type, Level, and Method of Winter Protein Supplementation on Cumulative Weight Changes and Body Condition Changes in Beef Cows

Day of experiment	HI-DEHY	SS	STAGGER-DEHY	LO-DEHY	SE[a]
Weight changes					
Starting weight	1104	1101	1117	1116	42
85	56[c]	41[c]	2[d]	8[d]	11
102 (calving)	−123[c]	−157[d]	−181[d]	−170[d]	16
167 (breeding)	−140[c]	−145[c]	−177[d]	−169[d]	11
259 (trial end)	7	3	−13	−22	11
Condition score changes					
Starting CS[b]	6.0	6.1	6.1	6.1	.2
85	−.3[c]	−.2[c]	−.7[d]	−.6[d]	.1
102 (calving)	−.4[c]	−.4[c]	−.9[d]	−.8[d]	.1
167 (breeding)	−.7	−.8	−1.1	−1.0	.1
259 (trial end)	.1	−.1	−.2	−.1	.2

[a]SE = standard error of the difference between means.
[b]CS = body condition score on a scale of 1-9.
[cd]means within a row with different superscripts differ (P<.05).

Table 28.2. Effect of Type, Level, and Method of Winter Protein Supplementation on Calf Performance and Reproductive Performance of Cows

Item	HI-DEHY	SS	STAGGER-DEHY	LO-DEHY	SE[a]
No. cows	28	29	29	30	—
Calf birth wt, lb	85	84	87	83	4
65-d calf ADG[b], lb	1.7	1.7	1.7	1.6	.1
157-d calf ADG[b], lb	2.1	2.1	2.1	2.0	.1
Pregnancy rate[c], %	100.0	96.6	96.6	100.0	—
Calving interval[c], d	364	363	364	369	6
Percent bred in each 1/3 of breeding season[c]					
First	71.4	78.6	60.7	63.3	—
Second	21.4	17.9	32.1	30.0	—
Third	7.2	3.5	7.2	6.7	—

[a]SE = standard error.
[b]ADG = average daily gain.
[c]Estimated from fetal ages determined by rectal palpation.